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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/405,176	09/24/1999	HIROYUKI SHINBATA	35.C13853	9205

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EXAMINER
KIM, CHONG R

ART UNIT	PAPER NUMBER
2623	

DATE MAILED: 01/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/405,176	SHINBATA, HIROYUKI
	Examiner	Art Unit
	Charles Kim	2623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 October 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7,16,19 and 22-33* is/are pending in the application.

4a) Of the above claim(s) *22-33* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7, 16, 19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *22-33* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☒ The proposed drawing correction filed on *30 October 2002* is: a)☒ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☒ Interview Summary (PTO-413) Paper No(s). 14
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Finality Withdrawn

1. In accordance with the telephone conversation with Richard Fritz (Registration # 50,333) on Thursday, January 21, 2003, this office action replaces the write-up of the previous office action mailed on January 13, 2003. The references cited were provided with the previous office action and therefore are not included in this office action.

The finality of the previous office action is withdrawn. This office action is made FINAL.

Election/Restrictions

2. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims1-7, 16, and 19 are drawn to image processing for setting an extraction area from a projection, where the projection is determined from a deletion step, classified in class 382, subclass 199.

II. Claims 22-24, 30, 32 are drawn to image processing for determining an area of an image based on the image outline, classified in class 382, subclass 206

III. Claims 25-29, 31, 33 are drawn to image processing for calculating an average pixel value of an image to obtain an area for extraction, classified in class 382, subclass 194.

3. The inventions are distinct, each from the other because:

Inventions I and II are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention I has separate utility such as analyzing an image of a cervical vertebra. See MPEP § 806.05(d).

Inventions II and III are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention II has separate utility such as determining the outline of an image. See MPEP § 806.05(d).

Inventions I and III are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention III has separate utility such determining the average pixel value of an image. See MPEP § 806.05(d).

4. Newly submitted claims 22-33 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: they are separately usable.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 22-33 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Response to Amendment

5. Applicant's amendment filed on October 30, 2002 have been entered and made of record

6. In view of Applicant's amendment, the objection to the specification due to a non-descriptive title is withdrawn.

7. Applicant's arguments have been fully considered, but they are not deemed to be persuasive for at least the following reasons.

Applicants argue (page 12) that their claimed invention (claim 1) differs from the prior art because "none of the cited references disclose that the target for preparing the projection is set to the remaining area (obtained from the deleting step)." Examiner disagrees. Kido teaches that the "concerned region" in the radiation image is obtained by preparing a projection "only in accordance with the image data in the irradiation field" that has been previously extracted (col. 1, line 65-col. 2, line 4 and col. 2, lines 18-25). Kido extracts the irradiation field region thereby deleting the other area in the image. What remains is the irradiation field region from which he performs the projection processing. Admittedly, Kido does not call the extraction step a "deleting step", but Kido's irradiation field extraction step performs deletion of parts of the image and is therefore interpreted as a deleting step. Moreover, the applicant's prior admitted art discloses that the deleting step is well known on page 2, lines 3-20 of the applicant's specification. Therefore, the combination of Kido and the applicant's admitted prior art appear to still be applicable to claim 1 as amended.

Applicant's arguments with regards to new claims 22-33 are moot in view of the election/restriction discussed above.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1, 6, 7, 16, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kido (U.S. Patent No. 5,732,149), in view of applicant's admitted prior art disclosed in the Background of the specification on pages 1-3.

Referring to claim 1, Kido discloses an image processing method for extracting a pixel value characteristic of a radiation image comprising: preparing step of preparing a projection from the image (col. 2. line 1), and a setting step of setting a characteristic area from which a pixel value characteristic is obtained of the radiation image based on the projection (col. 1, line 65-col. 2, line1. It is noted that a "characteristic area" in the claim language is interpreted as being analogous to the "lung field region" or "concerned region" in the radiation image in col. 1, lines 65-66. It is also noted that the "image data in the lung field region" in col. 2, line 4 is interpreted to mean the pixel value characteristic). Kido further discloses that the characteristic area (concerned region) in the radiation image is obtained by preparing a projection "only in accordance with the image data in the irradiation field" that has been previously extracted (col. 1, line 65-col. 2, line 4 and col. 2, lines 18-25. It is noted that Kido extracts the irradiation field thereby deleting the other area in the image).

Therefore, since the applicant states that the deleting step is a conventional characteristic amount extracting method on page 2, line 19 of the specification, and since Kido is concerned

with extracting a characteristic amount from an image (col. 1, lines 9-10), it would have been obvious to include the deleting step when preparing a projection of the image of Kido.

Referring to claim 6, Kido further discloses photographing a thoracic vertebrae (col. 14, line 62 and figure 14d). Although Kido does not explicitly include photographing a cervical vertebra, it would have been obvious to photograph a cervical vertebrae instead of a thoracic vertebrae, since both a cervical and thoracic vertebrae are parts of a human body that are commonly X-rayed for medical diagnosis purposes.

Referring to claim 7, Kido further discloses that the pixel value characteristic extracted from the characteristic area is used to perform a gradation conversion processing (col. 2, lines 1-4).

Claim 16 recites an apparatus which corresponds to the method of claim 1. Arguments analogous to those presented above with respect to claim 1 are applicable to claim 16. The apparatus for performing Kido's method is inherent in his teaching.

Claim 19 recites a computer-readable recording medium on which a program for extracting a characteristic amount of a photographed image is recorded, which corresponds to claim 1. Arguments analogous to those presented above with respect to claim 1 are applicable to claim 19. While Kido does not appear to explicitly mention a computer-readable recording medium on which a program is recorded, this would have been clearly obvious in light of his disclosure. Note, for example, Kido discloses a CPU (col. 8, lines 8-10), thereby establishing his system as being or relating to a computer-based system.

9. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Kido (U.S. Patent No. 5,732,149) and the applicant's admitted prior art as applied to claim 1, and further in view of Nakao (U.S. Patent No. 6,035,064).

Referring to claim 2, Kido fails to include a binarizing step of binarizing the image obtained in the deleting step, and preparing a projection of the binarized image.

However, preparing a projection of binarized images was very common in the art. For example, Nakao discloses a binarizing process that binarizes an image (col. 4, lines 1-3), and prepares a projection of the binarized image (col. 4, lines 24-26 and figure 10a).

Therefore, since both Kido and Nakao are both concerned with extracting a characteristic amount of an image by a projection, it would have been obvious to modify the preparing step of Kido, in order to prepare a projection of an image that has been binarized, as taught by Nakao, so that the image data can be simplified for quicker processing (Nakao, col. 6, lines 44-47).

10. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Kido (U.S. Patent No. 5,732,149) and the applicant's admitted prior art as applied to claim 1, and further in view of Kanebako (U.S. Patent No. 5,680,471).

Referring to claim 3, Kido fails to include a weighting processing that is performed in accordance with a pixel value of the image

However, Kanebako discloses a weighting processing that is performed in accordance with a pixel value of the image (col. 11, lines 5-13).

Therefore, since both Kido and Kanebako are both concerned with extracting a characteristic area from a photographed X-ray image, it would have been obvious to modify the

preparing step of Kido, to include the weighting processing as taught by Kanebako, in order to extract a characteristic area based on the threshold that is determined by the weighting processing (Kanebako, col. 11, lines 5-10 and lines 29-30) to improve the extraction of this area from the background.

Referring to claim 4, Kanebako further discloses a weighting processing as described above, that is performed in accordance with a pixel position of the image (col. 14, lines 31-32)

11. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Kido (U.S. Patent No. 5,732,149) and the applicant's admitted prior art as applied to claim 1, further in view of Doi (U.S. Patent No. 6,011,862).

Referring to claim 5, Kido fails to teach that the characteristic area is set based on the secondary difference values of the projection.

Doi teaches a step of setting a characteristic area of an image based on the secondary difference (derivative) values of the projection (profile) (col. 9, lines 45-60 and figure 7. Note that the ribcage edge points in figure 7 are interpreted to mean a characteristic area).

Kido and Doi are both concerned with analyzing the pixel value characteristic of radiation images. Doi's method provides a simple and accurate method of determining the edges of the ribcage in the lung region of the image. Kido's characteristic area is interpreted as the lung field region of the image, as disclosed above. Therefore, it would have been obvious to modify Kido's setting step so that the characteristic area is set based on the secondary difference values of the projection as taught by Doi.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Armato U.S. Patent No. 6,335,980 discloses a method for the segmentation of lung regions in a radiation image.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Kim whose telephone number is 703-306-4038. The examiner can normally be reached on Monday thru Thursday 8:30am to 6:00pm and alternating Fridays 9:30am to 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on 703-308-6604. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-0377.

ck
January 23, 2003

Jon Chang
Primary Examiner